Software Requirements Specification

for

Rich n’ Famous Rental Car

Version 1.4

Prepared by Andrew Lane

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Revision History

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| --- | --- | --- | --- |
| **Name** | **Date** | **Reason For Changes** | **Version** |
| Andrew Lane | 6/5/15 | Initial Version | 1.0 |
| Andrew Lane | 6/18/15 | Added section 6 details and made corrections | 1.1 |
| Andrew Lane | 7/5/15 | Added class diagrams – Section 7 | 1.2 |
| Andrew Lane | 7/12/15 | Added Interaction Diagrams | 1.3 |
| Andrew Lane | 8/1/15 | Made corrections from HW6 and replaced analysis class diagrams with design class diagrams. | 1.4 |

# Introduction

Currently, Rich n’ Famous Rental Car leans heavily on employee generated manual processes. Several of these processes are inefficient and also error prone. In order to compete with other rental companies, Rich n’ Famous Rental Car must implement a fully automated rental system and restructure all existing processes. The end goals of becoming a “virtual rental company” and reducing running costs will be within the company’s grasp when these manually intensive processes are removed and replaced with an automated system.

This system will rely on a central server and database in which all employees will interact with to fulfill their duties. Given the employee has the necessary hardware at their disposal; they will be able to seamlessly fulfill their duties and significantly reduce human error. This system will limit customer/employee interaction by processing orders online. Not only will this make the rental process more painless for the customer, it will also give employees more time to focus on other non-customer duties. This automated system will allow the business to scale its processes which will in-turn allow the business to grow at a much more significant rate.

## Purpose and Intended Audience

The purpose of this document is to present a detailed description of the Rich n’ Famous Rental Car automated system. It will explain the purpose, features, interfaces, constraints, and processes of the automated system.

This document has been written in a manner in which all parties can interpret -specifically the product team, software development team, and client.

## Project Scope

This automated system will be designed to optimize Rich n’ Famous Rental Car’s current processes. Migrating tedious manual processes, such as creating vehicle reports or making reservations for example, to automated process will decrease the required effort as well as the error associated with manual processes.

This system is designed to integrate all business locations, employees, customers, and processes into a centralized system. More specifically, this system aims to facilitate the rental process for customers by offering online rental, catalog, and preferred customer benefits. The system will allow the tracking of vehicle statistics (added via **scanner**), as well as vehicle flagging (for maintenance an auction). The system will allow branches and employees to view pertinent information in regard to legal, vehicle statistics, vehicle availability, and customer information

The system will not be completely “hands free” as it will require both employee and customer interaction. This system will not run Rich n’ Famous Rental Car. This system will not replace traditional walk-in or phone-in business with its online functionality, however it will streamline these types of business into one.

## Terms, Definitions, and Acronyms

**CSS**: Cascading Style Sheet – Used to style a webpage user interface

**DMV**: Department of Motor Vehicle

**DMV** **Status**: Indicates whether a person can drive a vehicle or not

**Scanner**: Provided by client – A mobile handheld laser scanner with a built in keypad, credit card swipe, LCD Screen, and Thermal Printer, which utilize wireless technology to communicate with a computer terminal/database.

**USD**: United States Dollar

**W3**: World Wide Web Consortium – An international community that develops web standards

## References

[1] Rich (Owner of Rich n’ Famous Rental Car),”RF\_Scenario\_2013.pdf”, unpublished (appendix).

# Overall Description

## Product Perspective

This system will allow the business to seamlessly interact with customers as well as its employees. The system will convey all the necessary information between the two parties. This will primarily be done through the system’s web interface. Due to the centralization of the system, there will be no need to call other branches to get information about customers or vehicles. This system will allow all employees to work as a one, rather than separate entities.

Payment

Processing

## Product Features

The automated system for Rich n’ Famous Rental Car will:

* Provide an online rental service
* Provide an online rental catalog
* Provide preferred customer benefits
* Significantly reduce error
* Allow higher visibility of vehicle statistics and information to all employees
* Reduce costs associated with data entry
* Reduce costs associate with branch-to-branch communication
* Increase customer awareness (via website)
* Streamline the traditional rental process

## User Classes and Characteristics

There are 4 different types of users that will interact with the system: clerks, legal, maintenance, and customers. The system will be intuitive to use and operate. Any user, whether customer or employee, will be able to take full advantage of the system’s functionality with limited skills or computer knowledge.

Clerks are only concerned with customers, so they are able to manage reservations and view pertinent vehicle statistics.

Legal employees only deal with insurance related information. These employees can only view customer information; however they can update vehicle statistics as well.

Maintenance personnel only deal with vehicles, so they are only able to update vehicle statistics (Oil changes, repairs, etc…).

The above users can all generate reports based on their user role. The above users are allowed to use the website just as the customers are.

Customers are not allowed to access any employee facing data (as described above). Customers can only make reservations, view the catalog and other pertinent information, and enroll in the preferred customer program.

## Operating Environment

The core portions of system will be accessed mainly from multiple business locations; however other parts of the system will also be access from the internet. The wireless scanning interface is expected to work in an outdoor or indoor environment anywhere on the business premise. The system is expected to handle simultaneous users at once at any given time.

## Design and Implementation Constraints

In order to secure data, all wireless devices must communicate via encrypted channels.

The system will rely on two 3rd party entities:

* **DMV** – The system must communicate with the Department of Motor Vehicles in order to ensure a customer’s rental eligibility.
* Insurance – A 3rd part insurance firm properly handle claims on company vehicles.

## Assumptions and Dependencies

* Employees must receive training before using the new system.
* The system must integrate with the Rich n’ Famous Rental Car’s **scanners**.

# System Features

The completed system will provide the following functionality to all **employees** (in general) and will include the ability to:

* View reservations
* View vehicle statistics
* Locate vehicles in different lots
* Generate reports specific to the employee’s role

Specific functionality for **clerks** (only) will include the ability to:

* Manage (add, update, and cancel) reservations
* Manage (add, update, and delete) vehicles statistics (maintenance, availability, mileage, etc..)
* Manage (add, update) customer information (**DMV**, insurance, etc…)
* View customer information (**DMV**, insurance, etc…)

Specific functionality for **legal** (only) will include the ability to:

* Manage (add, update) vehicle insurance/claim information
* View customer information (**DMV**, insurance, etc…)

Specific functionality for **maintenance** (only) will include the ability to:

* Update vehicle statistics (maintenance, availability, mileage, etc...)

The completed system will provide the following functionality to all **customers**, and will include the ability to:

* Make/Cancel online reservations (including payment)
* View online catalog of rental vehicles
* Enroll in preferred customer benefits
* Manage (create, update, delete) their user profile

Specific functionality for **Mangers** (only) will include the ability to:

* Utilize all employee functionality
* Delete information employees aren’t permitted to.

Specific functionality for **Owner** (only) will include the ability to:

* Modify any aspect of the system in any way.

# Non-Functional Requirements

**Operational**

* The system should integrate with existing scanners
* The system should integrate with existing company machines
* The system should work on any modern web browser
* All employees should have access by default

**Performance**

* Any interaction between the user and system should not exceed 2 seconds (with the exception of generating large reports).
* The system will sync vehicle and customer information every 30 seconds.
* The system will have 99.9% uptime.

**Security**

* The system will be fully encrypted to ensure data security
* The system will prevent clerks, maintenance, customer, and legal personnel from performing actions that are not permitted for their type.
* Customer’s cannot access any vehicle statistic data
* The system must not share customer information

**Cultural and Political:**

* The system will only accept payment in **USD**
* The customer facing system must comply with **W3** and **CSS** standards
* The system must notify the customer it’s using browser cookies.

# External Interface Requirements

## User Interfaces

This section describes any external system user interfaces that may be required by the system, e.g., a console window.

## Hardware Interfaces

This section describes any external system hardware interfaces, e.g., an analog to digital converter that may be required by the system.

## Software Interfaces

This section describes any external software interfaces, e.g., input files to this system that were created by another software system.

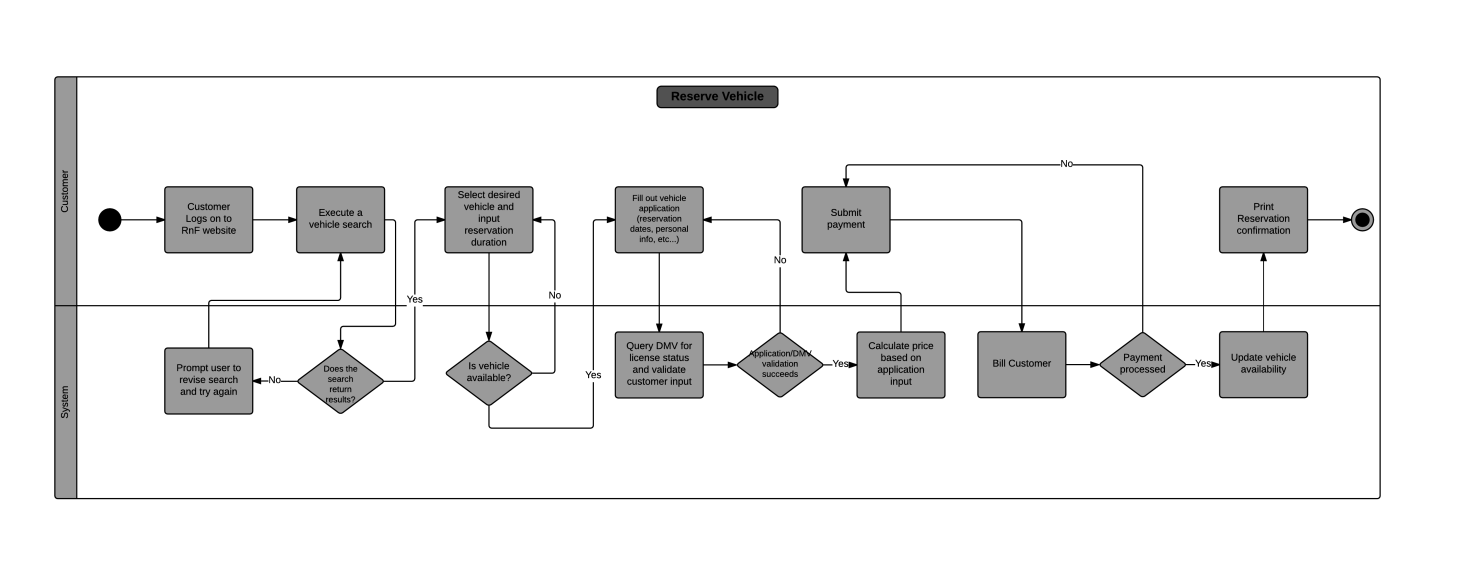
## Communication Interfaces

This section describes any external communication interfaces, e.g., TCP/IP communication sockets that are necessary for the operation of this system.

# Detailed Use Cases

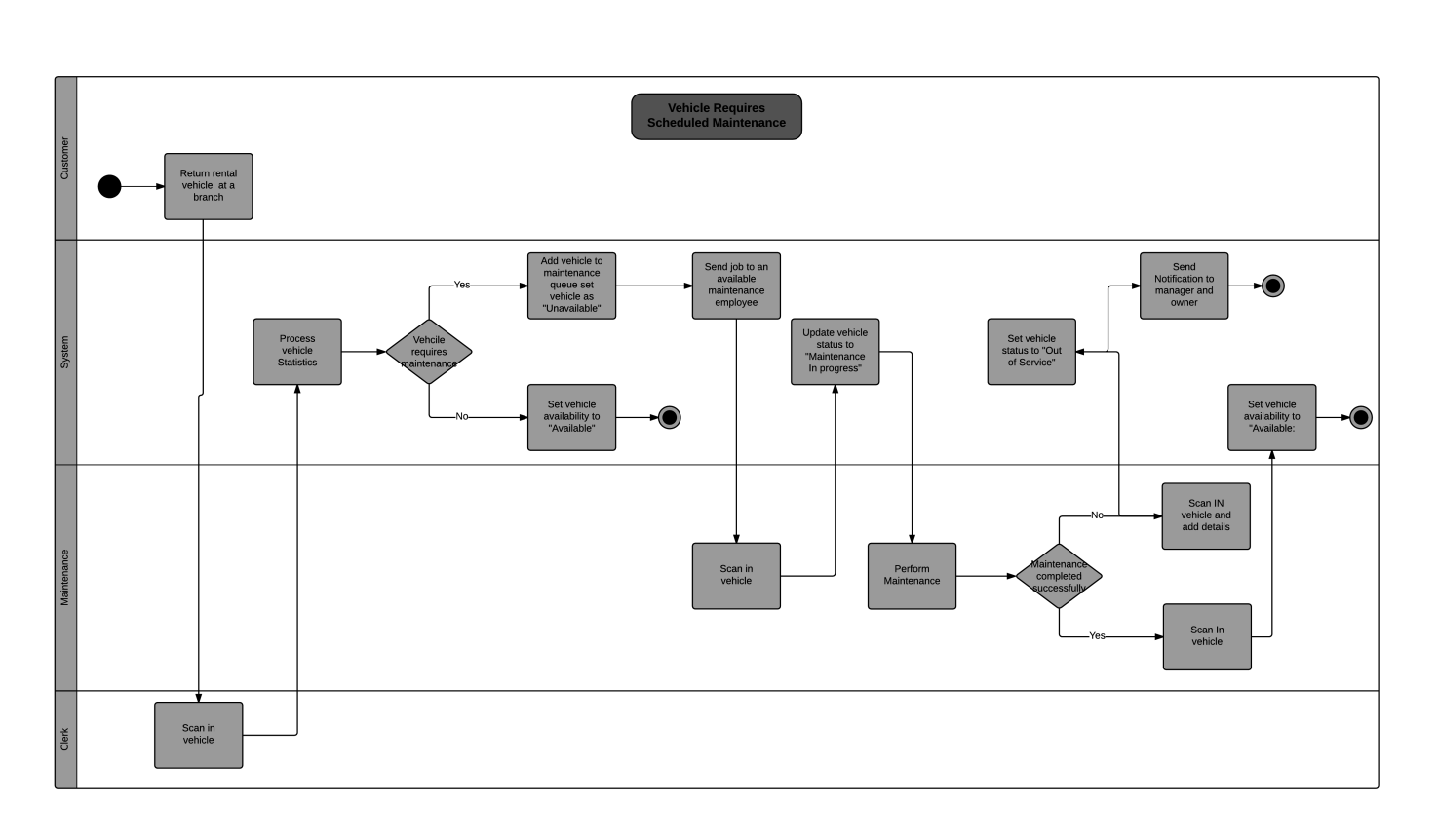
## Customer Makes Reservations

**Description**: An online customer searches for vehicles, selects a specific vehicle, and makes a reservation and payment.



## Vehicle Requires Maintenance

**Description**: A customer drops off a vehicle, and after being scanned in by a clerk, the system determines it requires maintenance and kicks off the proper process.



# Class Diagrams

## Overview Class Diagram

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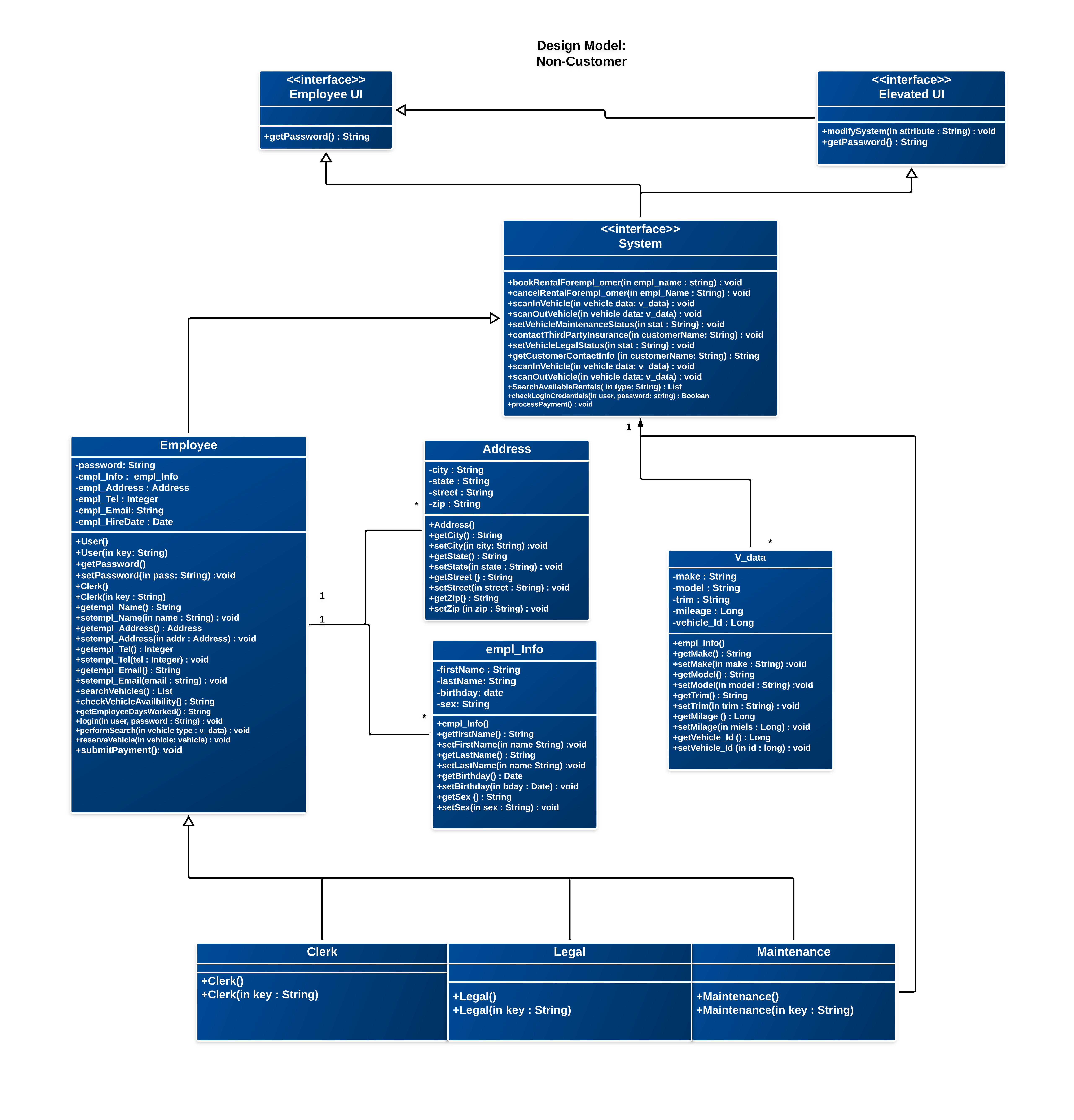
## Customer – Design Class Diagram

**Description**: This design model depicts the customer class as well as its attributes and methods. The customer class inherits from the “customer without membership” as well as the “customer with membership” classes separately, and primarily interacts with the system interface.



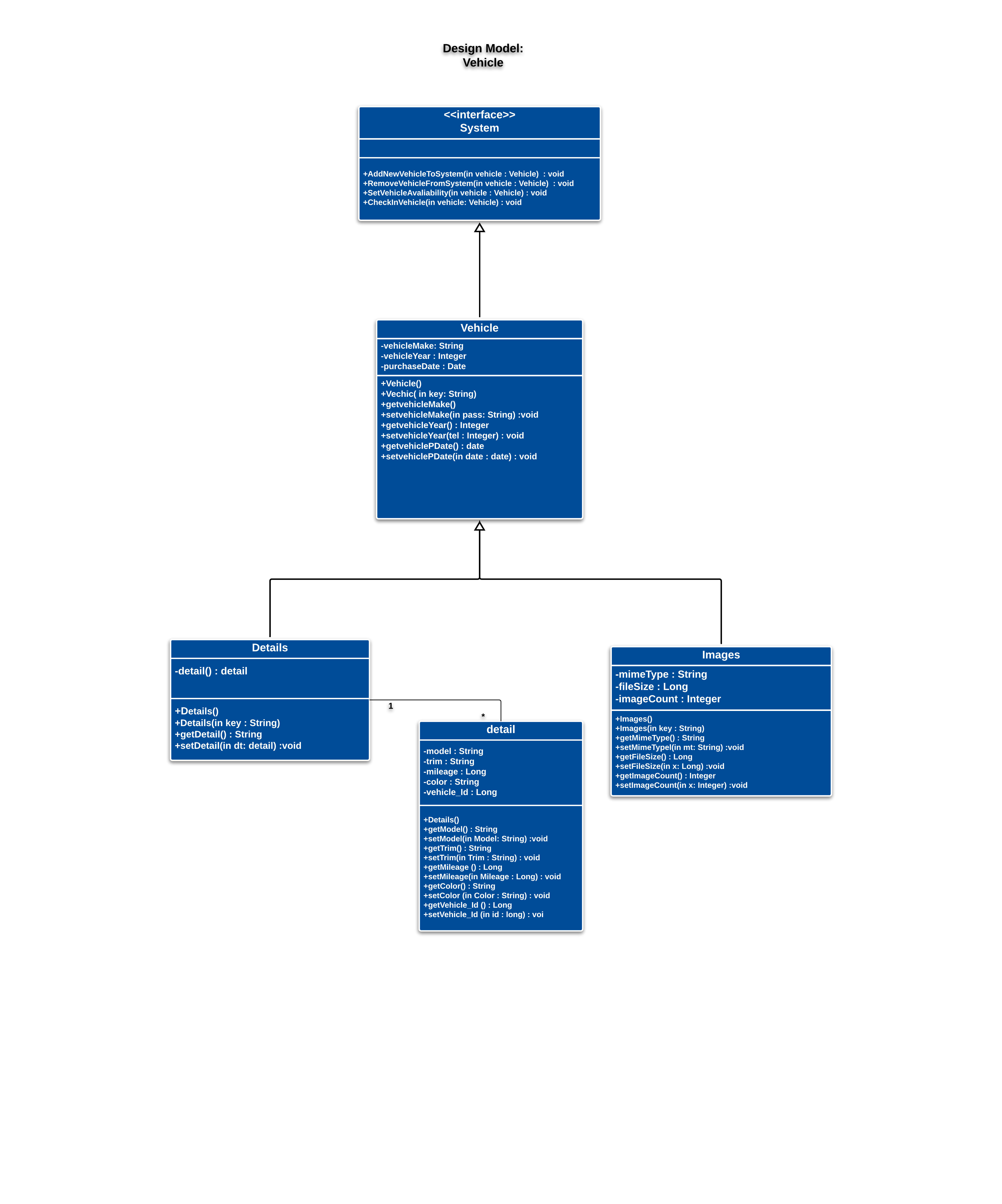
## Non-Customer – Design Class Diagram

**Description**: This design model depicts the non-customer classes along with each of its related classes attributes and methods. The non-customer has many shared attributes and methods across classes, and primarily interacts with the system interface.

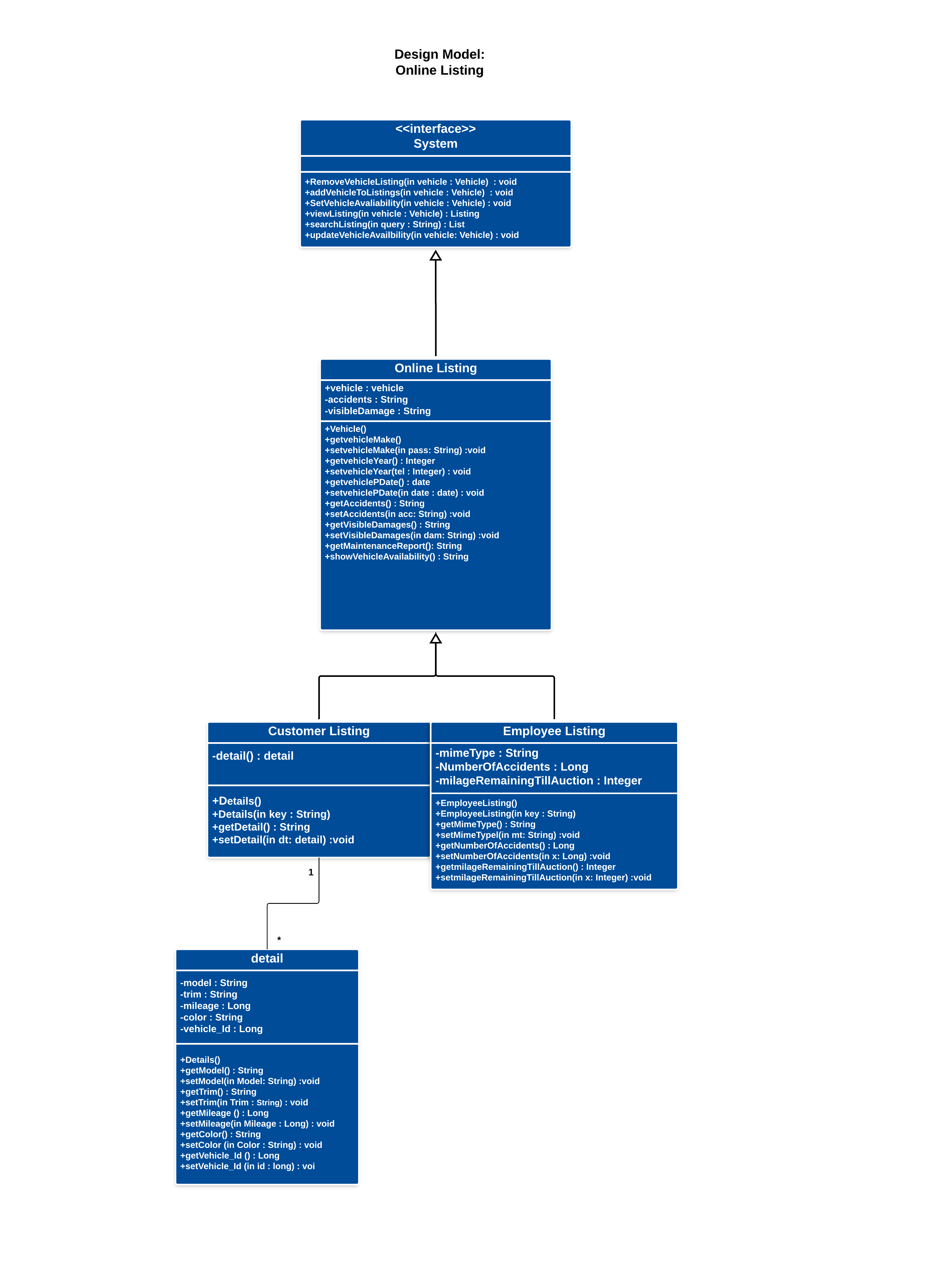


## Vehicle - Design Class Diagram

**Description**: This design model depicts the vehicle class as well as its attributes and methods. The vehicle class inherits from the images and details class. The vehicle class primarily interacts with the system interface.

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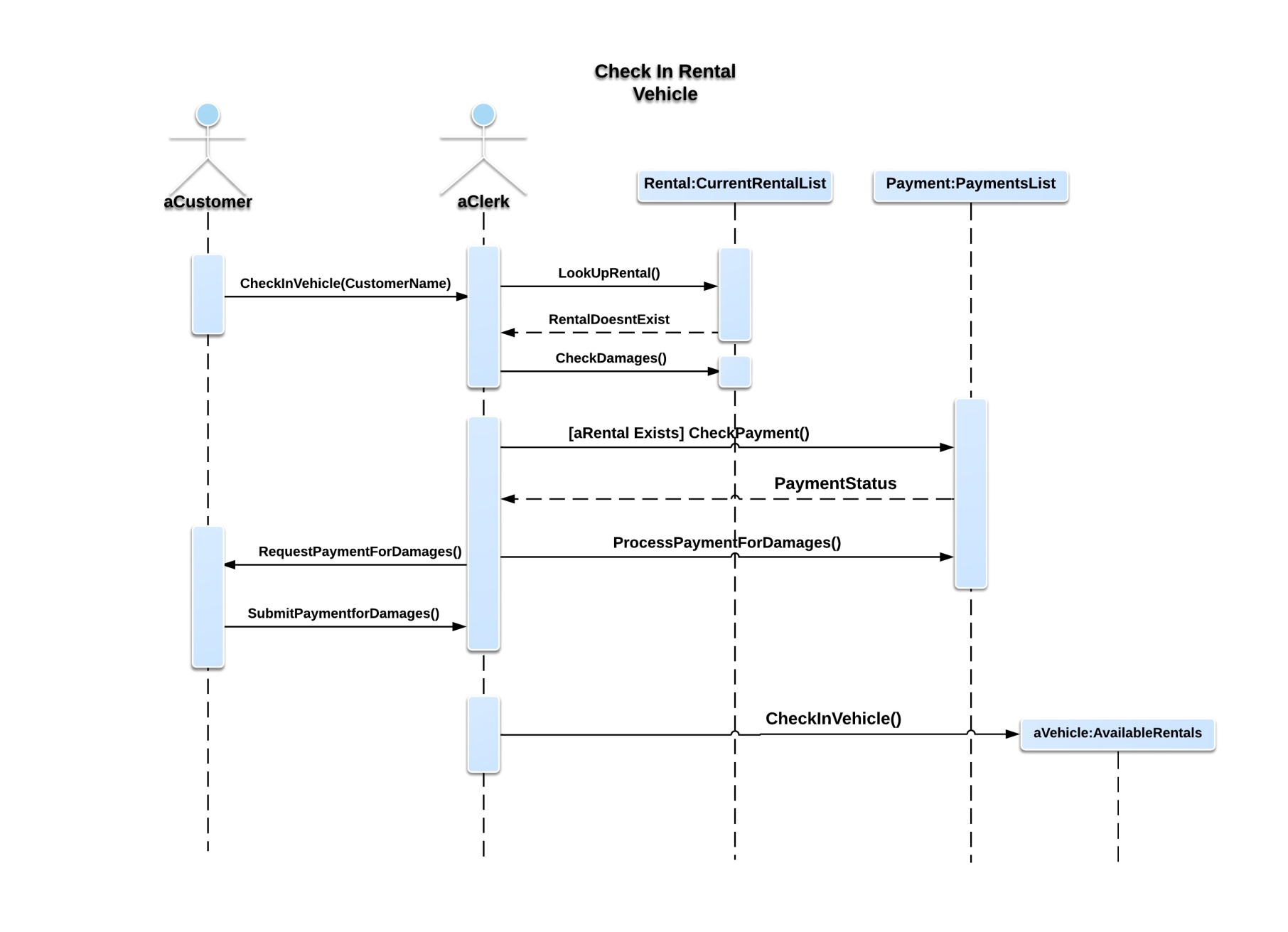
## Online Listing - Design Class Diagram

**Description**: This design model depicts the online class as well as its attributes and methods. The online listing class inherits from the customer listing or employee listing separately. The online listing class primarily interacts with the system interface.

# Interaction Diagrams

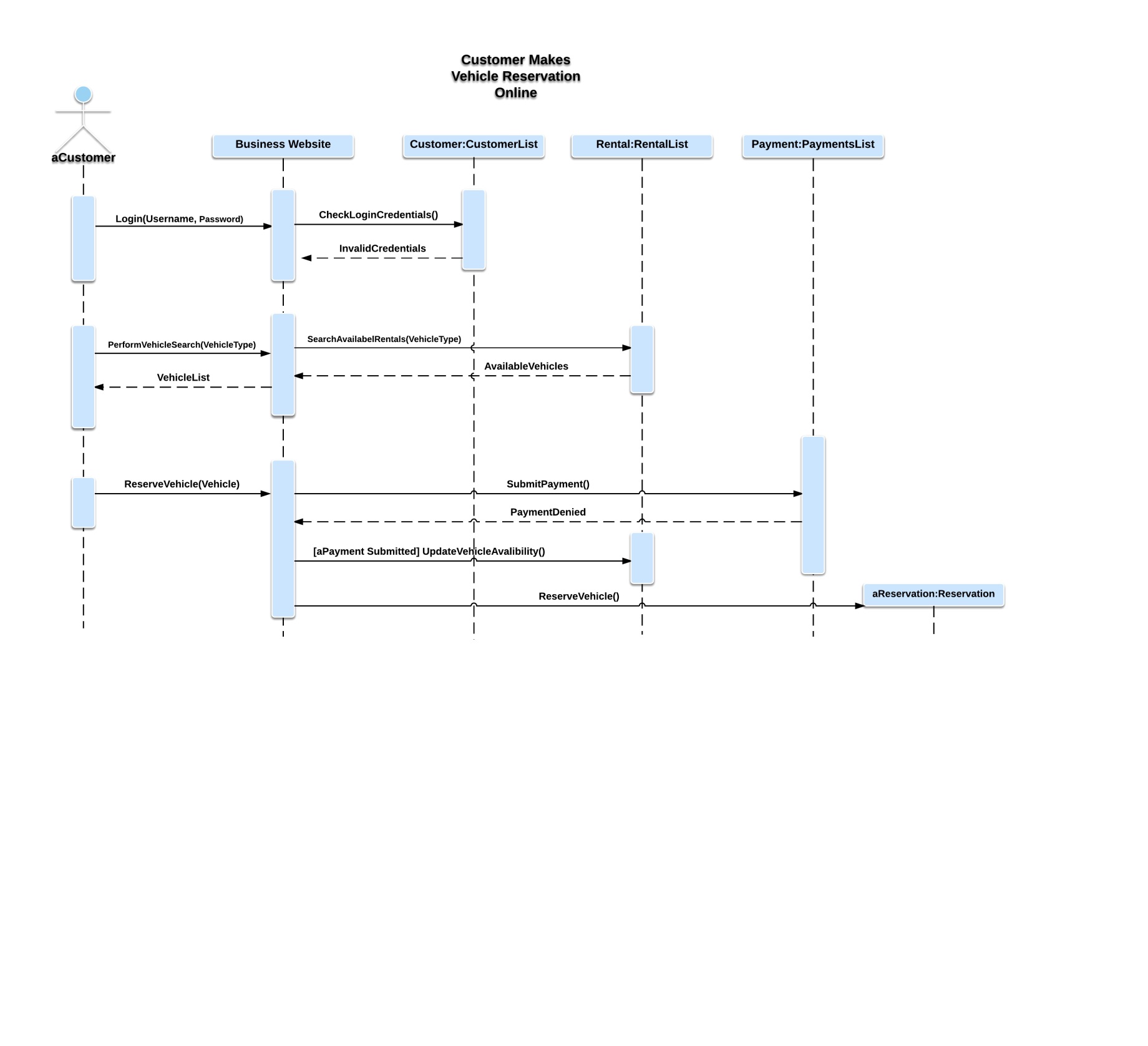
## Check In Rental Sequence Diagram

**Description**: A customer returns to the business location, and works with a clerk to check the rental vehicle in.



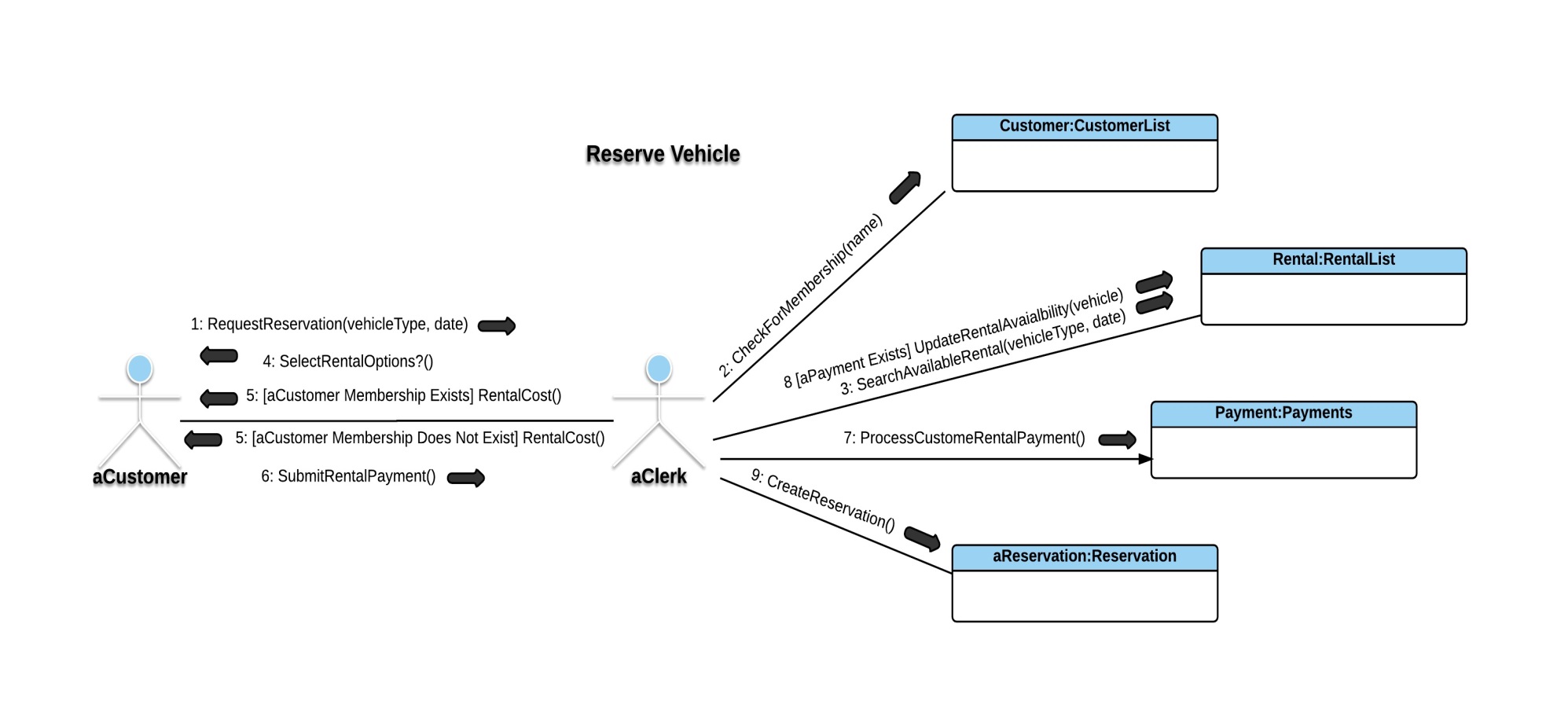
## Online Search and Reservation Sequence Diagram

**Description**: A customer searches for a vehicle online, and reserves it.



## Reserve Vehicle Communication Diagram

**Description**: A customer reserves a vehicle at a local branch by working with a clerk.

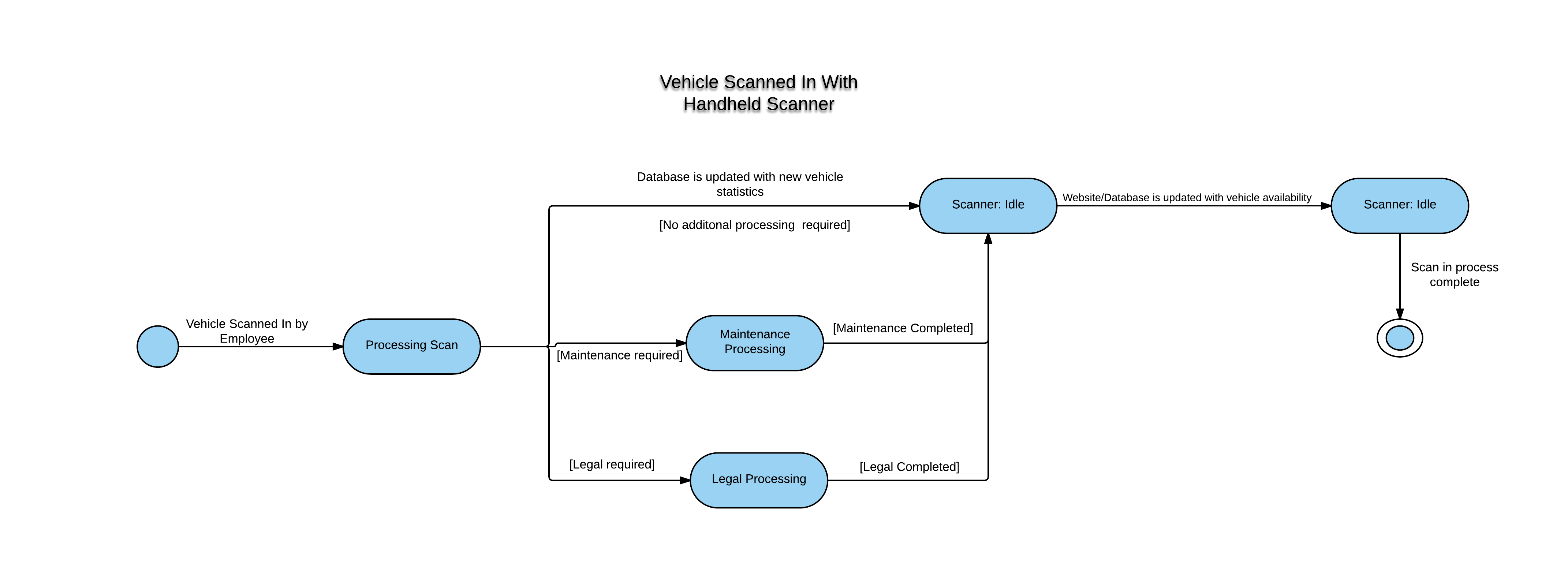


## Drop Off Requires Maintenance Communication Diagram

**Description**: A customer drops off a vehicle that requires maintenance

## Handheld Mobile Scanner State Machine Diagram

**Description**: An employee scans a vehicle with his/her handheld scanner, and the vehicle is processed.



**APPENDIX**

**Rich and Famous Rental Cars Scenario for CS 2450 Final Project**

To keep up with the competition, Rich Fry, the owner of Rich and Famous Rental Cars (a small but growing business with several locations in Utah) wants to automate their rental system. Watch the introduction video from Rich to learn more about his goals. Rich has already purchased some of the necessary hardware (mobile handheld laser scanners with a built in keypad, credit card swipe, LCD Screen, and Thermal Printer, which utilize wireless technology to communicate with a computer terminal/database.) It is Rich’s goal that by using these mobile scanners on each lot, his employees will be able to track the life cycle and status of each vehicle including the initial acquisition (cost), each vehicle’s revenue/expense history, maintenance history, accident reports, and disposal of each vehicle using this system. Rich also feels that the Internet offers further exciting opportunities for increasing efficiency and reducing costs. For example, rather than printing catalogs of available cars, he would like to make the inventory available to every Internet surfer for browsing on-line. For privileged customers, he would like to provide extra services, such as discounts, or advanced reservations of exotic vehicle types. His target saving in this area is a reduction of 15% in the cost of running each rental location. Within two years, using the full power of e-commerce, he hopes to offer all his services via a Web browser, with delivery and pick up at the customer’s home (bringing them back to our site to check out the vehicle), thus achieving his ultimate goal of the virtual rental company, with minimal running costs relative to walk-in stores. Some General Business Rules (you’ll be able to gather more by asking the client more specific questions): Employees Rich has one manager at each of his 6 locations in Utah. Rich is a manager at the main location in Salt Lake City, and also the owner of the business. He has several clerks who work on-site 24 hours a day, 7 days a week. The clerks are responsible for a variety of duties, including making reservations for a client that calls or walks in, updating, and cancelling reservations from an on-site terminal (computer). They are also responsible for checking a vehicle in and out, as well as generating several reports (primarily daily reservation and missing vehicle reports). He also employees several maintenance personnel who are responsible for (at a minimum) washing and vacuuming the vehicles when they are returned on-site. The maintenance people are also in charge of performing periodic (oil changes, tire rotations, safety and emissions checks, general repairs) on vehicles, based on a pre-determined maintenance schedule. These employees also generate maintenance reports on each vehicle, and record the associated expenses involved with each vehicle maintenance. Finally, he has legal personnel who are responsible for filing and tracking insurance claims with our 3rd party insurance firms. They are also responsible for filing and tracking missing vehicle reports when a customer does not return a vehicle within 48 hours (actually, the clerks spend another 24 hours trying to personally contact the renter, and legal proceedings are not filed until 72 hours). See below. Legal will need to generate tracking reports from our 3rd party insurance company. Vehicles • Car availability and status information (including active lot inventory, acquisition and disposal history, rental reservation history, periodic vehicle maintenance, insurance claims, and vehicle accident reports) are maintained and tracked internally via a central database (that is used by all 6 rental locations) using barcodes and laser scanners, on each site, to send and transmit the information. • Each vehicle is assigned to one rental location only and is tracked by its unique VIN#. All information about a vehicle is available to management (and certain information to rental clerks) via the counter top terminals or accessed via the internet by management to check inventory at their own sites – the owner can check all sites. • When a new car is acquisitioned in inventory (purchased by the owner, Rich, for each rental location), it is delivered and received on-site. At that time, a clerk generates a bar code, using a special heat resistant label (printed from a regular laser printer in two copies) for the vehicle. One copy of the barcode is attached to the windshield of the vehicle , and another copy is maintained in the legal department in case the car is unable to be scanned (because it’s missing or severely damaged). • Scanners and Bar codes allow for tracking of a vehicle every time it arrives or departs the rental site. Scanning is also performed by maintenance personnel when a vehicle is checked in/out or for routine maintenance, and by the legal department (by scanning a copy of the bar code located in a binder) when the car has been involved in an accident. Bar codes are removed from the binder and windshield when the car is disposed of from inventory. • Once a reservation is billed (completed), or cancelled, the car is placed back in inventory (unless it is damaged). Cancelled cars (not driven) are placed directly back in active inventory. Driven (billed) cars are first sent to maintenance for a car wash (and perhaps other maintenance). • When a car is returned, it is inspected, tire pressure checked, washed, and either returned to inventory or remains in maintenance for periodic maintenance (see below). • If a rental is more than 48 hours overdue, the clerk can determine this by generating a report (at 7AM each morning). After a customer shows up on the 48 hour late report, the clerk spends the next 24 hours trying to contact the customer. If the customer does not respond, the clerk files a report with the legal department, which scans in the vehicle (using the bar code copy), and begins a process of notifying the authorities, and 3rd party insurance that the vehicle is missing. • A wrecked (damaged) car or a car that breaks down will also require additional reports and tracking with 3rd party insurance, and will be transferred to legal for tracking purposes using the same process. Once resolved, the vehicle may be scanned back in by the clerk and returned to the rental inventory. • All cars must be returned to their original rental location (because of inventory purposes). • Periodic maintenance is done, in house, via a group of technicians – including oil changes every 3000 miles, and more, based on a pre-determined database table of scheduled maintenance (which depends on the actual vehicle type). • Here is an example of scheduled maintenance (not inclusive) which the technician is able to add/delete/and update the master list. Vehicle Type Maintenance Frequency Cost All Car Wash and Vacuum Every time an undamaged vehicle returns to the lot $25 Standard Cars Oil Change Every 3000 miles $30 High Performance or Specialty Cars Synthetic Oil Change Every 7500 miles $60 Industrial Trucks Oil Change Every 4000 miles $50 All Tire Rotation Every 10,000 miles $50 All Repairs As Needed – based on notes provided by the rental clerk checking the vehicle in, or notes made by the maintenance personnel once the vehicle is examined in the shop. $50 per hour plus parts • Vehicles more than one year old are turned over to an auto auctioning facility and removed from the inventory. Management performs this function. • Vehicles are acquisitioned for the Rich and Famous rental car company through a 3rd party contract with Fleet Rental Services. The owner performs this function. • The Internet will eventually show the available vehicles, prices descriptions, via an on-line catalog, and allows a member to sign up to be a preferred member and received advanced notifications for special vehicles. • Insurance options will affect the disposition of the vehicle, if it is wrecked or damaged. • Inventory, Reservation, Customer, and various histories (maintenance, insurance claims, etc) can only be run by an authorized employee. Customers • A Customer can rent a car in store (through a rental clerk) or via the Internet. However, all reservations require a credit card, and have a 24 hour cancellation policy. • A customer is offered “in house” insurance at the time of PICKING UP the reservation. If the insurance is declined, a major credit card is required (no debit or cash). We only accept cash or debit up front if our “in house” insurance was purchased with the rental. Regardless, upon return, if cash or debt is used (only applicable to customers who purchased “in house” insurance), the customer will need to go inside the office to settle the final payment. However, if the customer prefers to charge the final bill to the credit card, then this can be done from the mobile scanner by once again swiping the same credit card when the customer returns the car. • If a customer buys our insurance, it relieves them for all liability, except for a $1000 deductible, when the damage is NOT due to customer negligence (like drunk or wreck less driving). If negligence is involved, then the car is turned over to legal for insurance processing. • Insurance processing is a 3rd party service that goes after a driver’s personal insurance or credit card insurance on our behalf. However, the legal department must still file the claim, and have the ability to monitor and track its status. • A Customer can sign up to be a preferred member to qualify for discounts and special offers. • A Customer must provide a valid credit card, US driver’s license, and proof of address to become a member. This information is used to interface with the DMV for the driver’s records. The DMV must return a “good” or better driving status in order for the customer to be considered a preferred member for a particular rental. • Preferred members automatically receive a 10% discount off all rentals (made on the Internet only), and their 10th rental is free (for up to 3 days). If the 10th rental happens to be more than three days, than the prorated discount is applied. • Even if the 10% discount is issued on the Internet, a check is still made when the car is PICKED UP. • A preferred member’s DMV status is checked prior to each rental PICK UP by passing in the Driver’s License number and State (any of the 50). The DMV returns a “Valid” license status and a driving record status. If the DMV driving record status drops below “good” (on an Excellent, Good, Fair, Poor scale) then the preferred status is revoked for this rental, and this particular rental will not receive a discount or credit towards the 10th rental nor will he receive the 10% discount (if the reservation was previously made via the Internet). Consequently, people without a United States driver’s license do not qualify for this preferred status, as there is no way to check. • If the DMV ever returns an “Invalid” license – then we do not rent the vehicle. No matter if a customer is preferred or not, we always run a Valid check (we only do an additional Status Check for preferred members) with the DMV to determine if the driver’s license is still active. Obviously, we do not have this feature for driver’s coming from out of country, and for the meantime, this is a manual (visual) verification. • Any reservation can be cancelled by phone, in person, or the Internet. But, a customer is billed for one day’s rental if they have not cancelled the reservation within 24 hours, or fail to pick up the vehicle. THERE ISN’T ANY “HIDDEN” INFORMATION IN THIS SCENARIO. THE CLIENT HAS GIVEN YOU AS MUCH INFORMATION IN WRITING AS HE CAN. HOWEVER, YOUR GROUP IS STILL EXPECTED TO MEET WITH THE CLIENT VIRTUALLY, IF YOU HAVE ANY SPECIFIC Q&A WHILE DOING THE DESIGN AND ANALYSIS OF THE SYSTEM. AN INTRODUCTION VIDEO HAS ALSO BEEN MADE AVAILABLE.

